

Contents

Part I Network Design

- 1 Design for Optimizability: Traffic Management of a Future Internet** 3
Jiayue He, Jennifer Rexford, and Mung Chiang

- 2 Valiant Load-Balancing: Building Networks That Can Support All Traffic Matrices** 19
Rui Zhang-Shen

- 3 Geometric Capacity Provisioning for Wavelength-Switched WDM Networks** 31
Li-Wei Chen and Eytan Modiano

- 4 Spectrum and Interference Management in Next-Generation Wireless Networks** 47
Harish Viswanathan and Sivarama Venkatesan

- 5 Cross-Layer Capacity Estimation and Throughput Maximization in Wireless Networks** 67
V.S. Anil Kumar, Madhav V. Marathe, and Srinivasan Parthasarathy

- 6 Resource Allocation Algorithms for the Next Generation Cellular Networks** 99
David Amzallag and Danny Raz

- 7 Ethernet-Based Services for Next Generation Networks** 131
Enrique Hernandez-Valencia

- 8 Overlay Networks: Applications, Coexistence with IP Layer, and Transient Dynamics** 157
Chen-Nee Chuah and Ram Keralapura

Part II Network Operations

9 Hash-Based Techniques for High-Speed Packet Processing	181
Adam Kirsch, Michael Mitzenmacher, and George Varghese	
10 Fast Packet Pattern-Matching Algorithms	219
Fang Yu, Yanlei Diao, Randy H. Katz, and T.V. Lakshman	
11 Anomaly Detection Approaches for Communication Networks	239
Marina Thottan, Guanglei Liu, and Chuanyi Ji	
12 Model-Based Anomaly Detection for a Transparent Optical Transmission System	263
Thomas Bengtsson, Todd Salamon, Tin Kam Ho, and Christopher A. White	
13 In-Network Monitoring	287
Danny Raz, Rolf Stadler, Constantine Elster, and Mads Dam	
14 Algebraic Approaches for Scalable End-to-End Monitoring and Diagnosis	319
Yao Zhao and Yan Chen	

Part III Emerging Applications

15 Network Coding and Its Applications in Communication Networks	343
Alex Sprintson	
16 Next Generation Search	373
Debora Donato and Aristides Gionis	
17 At the Intersection of Networks and Highly Interactive Online Games	403
Grenville Armitage	
18 Wayfinding in Social Networks	435
David Liben-Nowell	
Index	457